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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/463,136 04/17/00 JENTSCH

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EXAMINER

FORMAN, R

ART UNIT

PAPER NUMBER

1655
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/463,136

Applicant(s)

JENTSCH ET AL.

Examiner

BJ Forman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

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DETAILED ACTION

Specification

1. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.
2. A substitute specification including the claims is required pursuant to 37 CFR 1.125(a) because the top margin is too small to allow holes to be punched in the margin without obstructing text. Additionally, the specification lacks page numbers as required.

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

3. The disclosure is objected to because of the following informalities: The figures do not illustrate items 3, 4, 8 and 13 described in the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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a. Claims 1-15 are indefinite in Claims 1, lines 12-13 for the recitation "are physically and /or chemically and/or mechanically fixed on the support" because "physically" and "mechanically" are non-descriptive and non-limiting terms and therefore it is unclear how the objects are "fixed" on the support. It is suggested that Claim 1 be amended to clarify e.g. delete "physically" and "mechanically" and recite "are magnetically and /or chemically fixed on the support" (see specification, page 3, last 2 lines - page 4, line 4).

b. Claim 3 is indefinite in line 4 for the recitation "takes generally place simultaneously" because the syntax is confusing and because "generally" is a relative term which requires definition. It is suggested that the claim be amended to clarify e.g. delete "generally".

c. Claim 6 is indefinite in the recitation "mechanical means" because the phrase is non-descriptive and not further limiting on the "fixing". It is suggested that the claim be amended to clarify e.g. replace "mechanical means" with "magnetic means" (see specification, page 3, last 2 lines - page 4, line 4).

d. Claim 11 is indefinite in the recitation "the simultaneous arrangement of different biological-chemical substances" because both "the simultaneous arrangement" and "different biological-chemical substances" lack proper antecedent basis in Claim 1. It is suggested that the claim be amended to correct the antecedent basis e.g. "the fixed objects comprise different biological-chemical substances and are used for the detection of nucleotide sequences".

e. Claim 13, the phrase "like tensides" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). The recitation is further indefinite because the term "tensides" is not recognized scientific terminology. It is suggested that the claim be amended to distinctly claim the subject matter i.e. define the claimed stabilizing means.

f. Claim 14 is indefinite in the recitation "capillaries are used as tubes" because "capillaries" lacks proper antecedent basis in Claim 1. It is suggested that the claim be

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amended to provide proper antecedent correspondence i.e. replace "capillaries are used as tubes" with "wherein said tubes are capillaries".

g. Claim 15 is indefinite in the recitation "macro-molecules" because the recitation lacks proper antecedent basis in Claim 1. It is suggested that the claims be amended to provide proper antecedent basis i.e. amend Claim 1 to recite "macro-molecules" or amend Claim 15 to delete "macro-molecules".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gavin et al. (U.S. Patent No. 6,074,609, filed 3 April 1997) in view of James et al. (U.S. Patent No. 5,979,251, filed 29 May 1998) and Koster et al. (U.S. Patent No. 6,133,436, filed 19 September 1997). The claims are drawn to a method and device for fixing micro and /or nano objects on a support.

Regarding Claim 1, Gavin et al. teach a method for fixing micro-objects i.e. beads contained in a liquid phase on a support comprising: liquid phases containing several beads are filled into tubes and transported in the direction of a narrowing outlet opening of the tubes wherein the shape and size of the narrow outlet openings prevent the passage of more than one bead; and the narrow outlet openings of the tubes are positioned three-dimensionally in relation to a support plane before the objects emerge and the beads having passed through the

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outlet opening are physically and/or chemically and/or mechanically fixed on the support in the defined position (Column 2, lines 20-67 and Fig. 22) but they do not teach the tubes are conically narrowing tubes. However, James et al. teach a similar method wherein liquid phases containing micro-objects i.e. beads are filled into conically narrowing tubes and transported in the direction of a narrow outlet opening wherein the size and shape of the outlet opening prevent the passage of more than one bead (Column 1, line 64-Column 2, line 4 and Fig. 8). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the method of Gavin et al. with the teachings of James et al. to obtain the claimed invention because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to modify the transporting tubes of Gavin et al. with the narrowing tubes taught by James et al. for the expected benefit of simple and reliable distribution of the micro-object as taught by James et al. (Column 1, lines 44-46).

Regarding Claim 2, Gavin et al. teach the method wherein transport of the liquid phase including the bead through the tubes takes place by a means of applied pressure difference between the wide filling hole and the narrow outlet opening (Column 14, lines 33-46).

Regarding Claim 3, Gavin et al. teach the method wherein exiting as well as positioning and fixing of the bead takes place simultaneously i.e. by magnetic, chemical or hydrophobic attractions (Column 13, lines 11-25).

Regarding Claim 4, Gavin et al. teach the method wherein the support is covered with a reactive layer in advance i.e. the support is chemically treated (Column 13, lines 13-22).

Regarding Claim 5, Gavin et al. does not teach photochemical fixing. However, Koster et al. teach a method of fixing micro-objects to a support wherein the fixing is achieved photochemically (Column 5, lines 4-25 and Table 1). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the method of Gavin et al. with the teachings of Koster et al. to obtain the claimed invention because the skilled practitioner in the art would have been motivated with a reasonable

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expectation of success to apply the photochemical fixing of Koster et al. to the method of Gavin et al. for the expected benefit of utilizing a support-binding chemistry different from other binding chemistries as taught by Koster et al. (Abstract).

Regarding Claim 6, Gavin et al. teaches the method wherein the fixing takes place by mechanical means i.e. mechanical delivery (Column 7, line 54-Column 8, line 8).

Regarding Claim 7, Gavin et al teach the method wherein the fixing of the beads takes place by magnetic forces (Column 13, lines 11-13).

Regarding Claim 8, Gavin et al. teach the method wherein following fixing the beads on the supports, they are covered with a layer of gel (Column 3, lines 13-15).

Regarding Claim 9, Gavin et al. teach the method wherein the liquid phase micro-objects and support are electrostatically charged in opposite (Column 13, lines 11-13).

Regarding Claim 10, Gavin et al. teach the method comprising a single or multiple liquid phases i.e. reservoirs (Column 14, lines 47-53) but they do not teach the objects in the same tube are of the same type and different tubes are at least partially different. However, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the method of Gavin et al. wherein multiple reservoirs are utilized to multiple liquid phases wherein each liquid phase in each reservoir comprises objects of the same type and different reservoirs comprise at least partially different objects because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to segregate the objects by known type for the obvious benefit of simplifying spatial arrangement and identification.

Regarding Claim 11, Gavin et al. teach the method is used for fixing micro-objects comprising chemical compounds on a support wherein the chemical compounds are linked to the beads (Abstract) but they do not specifically teach the compounds are nucleotide sequences. However, Koster et al. teach the similar method wherein the micro-objects comprise chemical compounds and wherein the compounds are nucleotide sequences wherein the nucleotides

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sequences are compounds linked to the beads (Column 2, lines 11-13). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the method of Gavin et al. with the teachings of Koster et al. to obtain the claimed invention because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to apply the bead-linked nucleotide sequence compounds of Koster et al. to the bead-linked chemical compounds of Gavin et al. for the expected benefit economy of time, labor and material in the evaluation of nucleotide sequence libraries as taught by Gavin et al. (Column 2, lines 1-3).

Regarding Claim 12, Gavin et al. does not teach the detection of nucleotide sequences. However, Koster et al. teach the similar method wherein a test liquid is applied on the support (Column 7, lines 22-24) and via a known chemical reaction a microscopic determinable change of properties of the object surface is detected (Column 8, lines 43-58). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the method of Gavin et al. with the teachings of Koster et al. to obtain the claimed invention because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to modify the method of Gavin et al. with the nucleotide detection of Koster et al. for the expected benefit of economy of time, labor and material in the evaluation of nucleotide sequence libraries as taught by Gavin et al. (Column 2, lines 1-3).

Regarding Claim 13, Gavin et al. and Koster et al. do not teach method comprising a stabilizing means. However, stabilizing means were known and routinely practiced in the art at the time the claimed invention was made. It would have been *prima facie* obvious to one skilled in the art to utilize stabilizers in the methods of Gavin et al. and Koster et al. for the obvious benefit of maintaining molecular integrity.

Regarding Claim 14, Gavin et al. teach the tubes are capillaries i.e. "just large enough to receive a single solid support" (Column 14, lines 24-26).

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Regarding Claim 15, Gavin et al. teach the method wherein the micro objects are three-dimensional shaped bodies i.e. beads (Column 5, lines 49-60).

Regarding Claim 16, Gavin et al. teach the device for execution of the method according to Claim 1 comprising: a three-dimensional adjustable positioning head which comprises a bundle-like arrangement of tubes which respectively have a filling hole and a narrow outlet opening (Fig. 22 and Column 14, lines 47-54), a support with a support plane which is arranged parallel to an outlet plane of the tubes and actuators for positioning the outlet openings above the support plane and adjustment actuators for positioning the support (Fig. 5-6 and Column 7, line 62-Column 8, line 8) but they do not teach the tubes are conically narrowing tubes. However, James et al. teach a similar method wherein liquid phases containing micro-objects i.e. beads are filled into conically narrowing tubes and transported in the direction of a narrow outlet opening wherein the size and shape of the outlet opening prevent the passage of more than one bead (Column 1, line 64-Column 2, line 4 and Fig. 8). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the device of Gavin et al. with the teachings of James et al. to obtain the claimed invention because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to modify the transporting tubes of Gavin et al. with the conically narrowing tubes taught by James et al. for the expected benefit of simple and reliable distribution of the micro-object as taught by James et al. (Column 1, lines 44-46).

Regarding Claim 17, Gavin et al. teach the device comprising a positioning head consisting of several positioning cells (Column 14, lines 47-53).

Regarding Claim 18, Gavin et al. does not teach the device comprising distance piece. However, James et al. teaches the similar device comprising distance pieces on the reaction vessel which define each location in the array (Fig. 8 #108). It would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the device of Gavin et al. with the teachings of James et al. to obtain the claimed invention

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because the skilled practitioner in the art would have been motivated with a reasonable expectation of success to apply the distance piece of James et al. to the device of Gavin et al. for the obvious benefit of defining parameters of the fixed objects.

Regarding Claim 19, Gavin et al. teaches the device wherein the tubes are capillaries i.e. "just large enough to receive a single solid support" (Column 14, lines 24-26).


Conclusion

10. No claim is allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (703) 306-5878. The examiner can normally be reached on 6:45 TO 4:15.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (703) 308-1152. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4242 for regular communications and (703) 308-8724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.


BJ Forman, Ph.D.

October 19, 2000


W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600

10/23/00